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# THE POLITICAL ECONOMY OF CAPITAL INCOME AND PROFIT TAXATION IN A SMALL OPEN ECONOMY

by

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## *Abstract:*

This paper considers the political economy of the mix of profit, investment and saving taxation in a small open economy where agents generally differ in their shares of profit and other income. In this setting, capital income taxation can have the dual role of financing government spending and of redistributing income. With majority voting, several different constellations of profit, investment and saving taxes can arise. The paper, for instance, can explain why distorting saving taxation exists, even if profits are not taxed to the fullest extent. Alternatively, saving may be subsidized, even if profit and investment are highly taxed. The role of the foreign ownership of domestic firms in explaining capital income taxation is examined for the two cases of majority voting and a representative agent. With majority voting, a higher foreign ownership may induce a shift towards higher profit or investment taxes and lower saving taxes as well as the opposite.

*Keywords:* political economy; capital income taxes

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## 1. *Introduction*

Contributions by Gordon (1986), Frenkel et al. (1991), Bruce (1992) and others have addressed the issue of optimal capital income taxes in an open economy. Generally, these papers exclude the possibility of the taxation of pure profits. Instead, the main focus is on the choice between distorting taxes on investment and on saving. A main result is that small countries optimally do not apply source-based capital income taxes, if there are no pure profits in the economy. Huizinga and Nielsen (1995) instead examine the optimal mix of investment and saving taxes for the case where there are pure profits that generally partly accrue to foreigners. For some institutional reason, pure profits cannot be fully taxed. The paper shows that in this instance investment and saving taxes are generally used jointly, as the investment tax serves as a second-best tax on pure profits. All of these papers assume a representative agent framework.

This paper instead assumes that people are heterogeneous in their endowment and profit income. In practice, the relative importance of endowment (or labor) income and profit income changes with, for instance, age. In this setting, agents have different views regarding the relative merits of saving, investment and profit taxation. Tax policy, as determined by voting, thus may differ from tax policy in a representative agent framework. In particular, the paper shows that pure profits may not be taxed at all or only very little, if the decisive voter receives relatively much profit income. Also, the model can explain a negative saving tax that serves to redistribute resources from agents with relatively abundant profit income to agents with relatively little profit income. Such a saving subsidy may arise in an economy where all domestic pure profits accrue to domestic residents. Alternatively, a saving subsidy can occur if all domestic agents receive profit and other income in an equal ratio, but part of domestic profits accrue to foreign residents. The paper also addresses how the capital income tax mix is affected by the extent of foreign ownership. With a representative agent, a higher foreign ownership share is shown to lead to a shift from residence, i.e. saving, taxation to source taxation, i.e. profit and investment taxation. In a voting equilibrium, however, the opposite is also possible. A higher foreign ownership can lead to a shift towards saving taxation, if it reduces the median voter's saving relative to average saving sufficiently.

Persson and Tabellini (1994) deal with the political economy of capital income taxation in

a closed economy, while Persson and Tabellini (1992) examine the political economy of capital income taxation in a two country tax competition model. Both papers concern the choice between a (source-based) capital income tax and a labor income tax. To our knowledge, no previous work exists on the political economy of the choice between different capital income tax instruments in an open economy. Mayer (1984) and others, however, have investigated the political economy of tariff formation in open economies. Stiglitz and Dasgupta (1971) consider the implications of limited profit taxation for optimal tax policy in a closed economy. Extending the analysis to include heterogeneous agents in their 1972 paper, they show that incomplete profit taxation may result if social welfare reflects the welfare of all individual agents.

The remainder of this paper is organized as follows. Section 2 outlines the model, while section 3 examines optimal tax policy as seen by any individual voter. Section 4 examines what capital income tax regimes can materialize in a voting equilibrium with heterogeneous voters, and it compares these outcomes to the capital income tax mix as chosen in a representative agent economy. Throughout, we generally allow for domestic firms to be in part foreign-owned. Section 5 specifically focuses on the relationship between the foreign ownership share of domestic firms and capital income tax policy. Finally, section 6 concludes.

## 2. *The model*

This paper considers a single good, two period economy. The economy is well integrated with the rest of the world and takes the international interest rate,  $r$ , as given. Agents in principle can receive two types of income: first period endowment income and second period profit income. Endowment income is any income the agent receives early in life, such as labor income, that does not reflect the agent's firm ownership share. Agents generally are heterogeneous in their first and second period incomes. Agent  $i$ , with  $i \in [0, 1]$  specifically receives a first period endowment income,  $Y_i$ , and a second period profit income of  $\sigma_i P$ , where  $\sigma_i$  is agent  $i$ 's firm ownership share and where  $P$  is second period firm profits (as defined below). In practice, the recipients of profit income may be the older generation of agents.

Agent  $i$ 's relative first period endowment income is denoted  $y_i = Y_i/Y$ , where  $Y$  is the aggregate first period endowment income. Below, we assume that domestic tax policy is set only

by domestic residents. It is useful, therefore, to distinguish between the domestic and foreign ownership of domestic firms. Specifically, let  $\alpha$  be the foreign ownership share of domestic firms. Further, let  $\gamma_i$  be agent  $i$ 's share of the domestic ownership of domestic firms so that  $\sigma_i = (1-\alpha)\gamma_i$  and  $\int_{i=0}^1 \sigma_i di = 1 - \alpha$ . Agents are ordered by the index  $i$  so that their profit/endowment income ratio, as proxied by  $\gamma_i/y_i$ , is non-decreasing in the index  $i$ . The agent with index  $i = 0$  ( $i = 1$ ) thus has the lowest (highest) profit/endowment income ratio of all domestic agents. The index  $i$  reflects the agent's age to the extent that the relative profit/endowment income across agents increases with age.

Agent  $i$ 's first period endowment income,  $Y_i$ , is divided between first period consumption,  $C_{1i}$ , and saving,  $S_i$ , while aggregate domestic saving is denoted  $S$ . Domestic firms make aggregate first period investments in capital,  $K$ . This capital is only productive in the second period. Second period firm output, specifically, is given by the concave production function  $F(K)$ .

The government has three capital income tax instruments at its disposal to obtain tax revenues in the second period: (1) the government can tax all saving,  $S$ , at a rate  $u$ , (2) it can tax domestic investment,  $K$ , at a rate  $v$ , and (3) it can tax domestic firm profits,  $P$ , at a rate  $z$ . For tax purposes, the firm's profits,  $P$ , are defined as its output net of the gross capital cost, i.e.  $P = F(K) - (1 + r + v)K$ . The profit tax,  $z$ , is restricted to lie in the interval  $[0, \bar{z}]$  with  $\bar{z} \leq 1$ .<sup>1</sup> A complete profit tax, i.e.  $z = 1$ , may not be feasible if it produces, say, a very strong incentive to underreport the value of output. In practice, governments may not be able to tax profits fully, as it is difficult to distinguish between pure profits and the ordinary return to capital and as profit generating firms may be internationally mobile. There are not assumed to be any restrictions on the sizes and signs of the saving tax,  $u$ , and the investment tax,  $v$ . The objective of government tax policy is to finance an exogenously given volume of government spending,  $G$ . The second period government budget constraint then is as follows,

$$0 < G = uS + vK + zP \quad (1)$$

Firms choose investments,  $K$ , so as to maximize their second period profits, which gives rise to the familiar optimality condition  $F'(K) = 1 + r + v$ . Agent  $i$  faces the following two period

budget constraint,

$$C_{1i} + \frac{C_{2i}}{1 + r - u} = y_i Y + \gamma_i \frac{(1 - z)(1 - \alpha)P}{1 + r - u} \quad (2)$$

where  $C_{2i}$  is agent  $i$ 's consumption in period 2. Agent  $i$  maximizes his lifetime utility denoted  $U(C_{1i}, C_{2i})$ , where we assume that all agents have identical and homothetic preferences. The optimality condition regarding agent  $i$ 's first period saving and consumption decision is given by  $U_{1i} = U_{2i}(1 + r - u)$  where  $U_{hi}$  is agent  $i$ 's marginal utility of consumption in period  $h$ .

The assumption of homotheticity implies that agent  $i$ 's consumption,  $C_{1i}$ , in the first period can be written as,

$$C_{1i} = p [y_i(1 + r - u) Y + \gamma_i(1 - z)(1 - \alpha)P] \quad (3)$$

where  $p$  is all agents' marginal propensity to consume in the first period out of second period income. Let  $S_i$  and  $s_i = S_i/S$  be agent  $i$ 's absolute and relative first period saving, respectively. Equation (3) and the fact that  $S_i = y_i Y - C_{1i}$  then imply that agent  $i$ 's relative saving,  $s_i$ , can be written as,

$$s_i = y_i [1 - (1 + r - u)p] \frac{Y}{S} - \gamma_i p (1 - z)(1 - \alpha) \frac{P}{S} \quad (4)$$

where  $(1 + r - u)p$  in (4) is the individual (and aggregate) marginal propensity to consume in the first period out of first period income. Equation (4) shows that agent  $i$ 's relative saving,  $s_i$ , is positively related to  $y_i$ , and negatively related to  $\gamma_i$ . This reflects that agents with relatively large first period endowment incomes (or relatively small second period profit incomes) have relatively large first period savings.

The homotheticity of preferences further implies that an agent's utility is proportional to the present value of his endowment and profit income. Agent  $i$ 's indirect utility,  $V(y_i, \gamma_i)$ , can thus be represented as,

$$V(\gamma_i, y_i) = \phi(I + r - u) \left[ y_i Y + \gamma_i \frac{(1 - \alpha)(1 - z)P}{I + r - u} \right] \quad (5)$$

where  $\phi()$  is some function of the net-of-tax return to saving,  $I + r - u$ , and where the term in square brackets is the present value of the agent's endowment and profit income. After dividing eq. (5) by  $y_i$ , we equivalently obtain that agent  $i$  maximizes an indirect utility function,  $W(\gamma_i/y_i) = V(\gamma_i, y_i)/y_i$  given by,

$$W\left(\frac{\gamma_i}{y_i}\right) = \phi(I + r - u) \left[ Y + \frac{\gamma_i}{y_i} \frac{(1 - \alpha)(1 - z)P}{I + r - u} \right] \quad (6)$$

Since  $y_i$  is fixed, agent  $i$ 's preferences over different values of the three taxes  $u$ ,  $v$  and  $z$  in (6) depend only on his relative profit/endowment income, as proxied by  $\gamma_i/y_i$ .

### 3. Tax policy from an individual voter's perspective

Endowment and profit income heterogeneity implies that the incidence of saving and other capital income taxes differs across agents. As a result, agents differ in their views regarding the optimal mix of capital income taxation. This section analyses the optimal mix of profit, investment and saving taxes for an arbitrary agent  $i$  with endowment and profit income shares  $y_i$  and  $\gamma_i$ . Agent  $i$ 's objective is to maximize his own utility  $U(C_{1i}, C_{2i})$ . Equivalently, agent  $i$  is interested in maximizing the following Lagrangean,

$$L_i = U(C_{1i}, C_{2i}) - \lambda [Y - C_{1i} - (1 - z)(1 - \alpha)\gamma_i P] + \mu [uS + vK + zP] + \kappa z + \mu(\bar{z} - z) \quad (7)$$

where  $\lambda$ ,  $\mu$  and  $\kappa$  are the Lagrange multipliers associated with the government budget constraint (1) and the minimum and maximum restrictions on the size of the profit tax,  $z$ .

Agent  $i$ 's first order conditions regarding the choices of the profit tax,  $z$ , the saving tax,  $u$ , and the investment tax,  $v$ , are as follows,

$$P [-U_2(1 - \alpha)\gamma_i + \lambda[I + (1 - \alpha)uP]] + \kappa - \mu = 0 \quad (8)$$

$$-U_2 s_i + \lambda(1 - e_u u) = 0 \quad (9)$$

$$-U_2 (1 - z)(1 - \alpha)\gamma_i + \lambda[(1 - z)[1 + (1 - \alpha)up] - e_v v] = 0 \quad (10)$$

where  $e_u = - (dS/du)/S \leq 0$  is the aggregate saving semi-elasticity with respect to the tax  $u$ , and  $e_v = - (dK/dv)/K > 0$  is the investment semi-elasticity with respect to the tax  $v$ . The assumption that agent  $i$  has positive saving, i.e.  $s_i > 0$ , guarantees that  $1 - e_u u > 0$  in (9), and vice versa. Note that the aggregate saving semi-elasticity,  $e_u$ , does not depend on the distribution of domestic endowment and profit income, as domestic agents have identical homothetic preferences.

Next, let us consider the optimal capital income tax mix from any agent  $i$ 's perspective. To do so, we will for now assume that domestic firms are in fact partly foreign-owned, i.e. that  $\alpha > 0$ . Given a certain profit tax rate  $z$ , the optimality conditions (9) and (10) imply the following relationship between the optimal values of the saving tax,  $u$ , and the investment tax,  $v$ , as seen by agent  $i$ ,

$$v = \frac{1 - z}{e_v} \left[ 1 + (1 - \alpha) \left( \hat{e}_i u - \frac{\gamma_i}{s_i} \right) \right] \quad (11)$$

where  $\hat{e}_i = (\gamma_i/s_i)e_u + p$ . Equation (11) and the government budget constraint (1) then together determine the optimal combination of the saving and investment taxes,  $u$  and  $v$ , given any value of the profit tax rate,  $z$ . To distinguish the various possible capital income tax regimes, it is useful to consider the three cases where the optimal profit tax rate,  $z$ , from agent  $i$ 's perspective is: [1] at its lower bound, i.e.  $z = 0$ , [2] at an intermediate value, i.e.  $0 < z < \bar{z}$ , and [3] at its upper bound, i.e.  $z = \bar{z}$ . The optimal value of the profit tax rate,  $z$ , from agent  $i$ 's perspective, following (6) depends on his relative profit income as proxied by  $\gamma_i/y_i$ . Other things and in particular  $G$  equal, agents with relatively low profit income favor relatively high profit taxes. We consider the three regimes as related to the optimal value of  $z$  in turn, starting with the intermediate case [2].

With  $0 < z < \bar{z}$  as in case [2], we can find from equations (8) and (9) that the optimal value of  $u$  from agent  $i$ 's perspective can be written as,



$$u = \frac{\gamma_i/s_i - 1/(1 - \alpha)}{\hat{e}_i} \quad (12)$$

where, of course, agent  $i$ 's relative saving,  $s_i$ , generally depends on all tax rates. The optimal saving tax rate,  $u$ , in (11) is easily seen to increase in  $\gamma_i$  and to decrease in  $y_i$  noting (4). Agent  $i$  thus prefers a larger saving tax (or a smaller saving subsidy), the larger his profit income share,  $\gamma_i$ , and the smaller his endowment income share,  $y_i$ . From (12), we can see that agent  $i$  in fact prefers a saving tax (subsidy) if  $\gamma_i/s_i$  exceeds (is less than)  $1/(1 - \alpha)$ . Note that an intermediate value of the profit tax,  $0 < z < \bar{z}$ , implies that  $\kappa = \mu = 0$  in (8). Then we can use (8) and (10) to check that optimally the investment tax rate,  $v$ , equals 0. An investment tax,  $v$ , is thus not part of the optimal capital income tax mix, if the profit tax rate,  $z$ , is at an intermediate value between its bounds 0 and  $\bar{z}$ . With  $u$  as in (12),  $v = 0$  and noting (1), we can see the profit tax rate,  $z$ , is given by,

$$z = \left[ G - S \frac{\gamma_i/s_i - 1/(1 - \alpha)}{\hat{e}_i} \right] / [F(K) - (1 + r)K] \quad (13)$$

With a revenue requirement,  $G$ , equal to zero, the profit tax rate,  $z$ , will be positive only if there is a saving subsidy, which occurs if  $\gamma_i/s_i$  is less than  $1/(1 - \alpha)$ .

Next, let us consider that optimally  $z = 0$  from agent  $i$ 's perspective as in case [1]. This case is relevant if agent  $i$  receives a relatively large profit income, i.e.  $\gamma_i/y_i$  is large, and if the overall government revenue requirement,  $G$ , is rather low. As suggested by equation (13), the optimal profit tax,  $z$ , is in fact 0 if with  $G = 0$  agent  $i$  optimally wishes to implement a saving tax, which occurs if  $\gamma_i/s_i$  exceeds  $1/(1 - \alpha)$ . Equations (8) and (10) further reveal that in this instance the optimal investment tax,  $v$ , is negative. Optimality regarding the choice of the saving tax,  $u$ , requires that  $1 - ue_u > 0$  in (9). Noting this and (11), we can see that agent  $i$  prefers a larger saving tax,  $u$ , and a more negative investment tax  $v$ , the larger is his relative profit income,  $\gamma_i/y_i$ . Finally, let us consider that optimally  $z = \bar{z}$  for agent  $i$  as in case [3]. This case is relevant if agent  $i$  receives a relatively small profit income, i.e.  $\gamma_i/y_i$  is small, and/or the government revenue requirement,  $G$ , is rather high. If the upper bound,  $\bar{z}$ , of the profit tax is strictly binding, then the investment tax,  $v$ , is positive if  $z = \bar{z} < 1$ . With  $z = \bar{z} = 1$ , eq. (11) instead implies that  $v = 0$ . Complete profit taxation and a positive investment tax cannot coexist, as introducing the invest-

ment tax on top of a complete profit tax will actually lower tax revenue from production. With  $z = \bar{z}$ , the saving tax,  $u$ , may be of either sign in this regime. For a large enough government revenue requirement  $G$ , however, both the saving tax,  $u$ , and (unless  $\bar{z} = 1$ ) the investment tax,  $v$  will be positive. Equation (11) then again reflects the optimal trade-off between the values of  $u$  and  $v$  preferred by agent  $i$ . As in case [1], agent  $i$  prefers a larger emphasis on saving taxation (and a smaller emphasis on investment taxation), the larger his relative profit income,  $\gamma_i/y_i$ .

The relationship between the preferred capital income tax mix and the government revenue requirement,  $G$ , is displayed in the three panels of Figure 1 for three agents with different values of  $\gamma_i/y_i$  for the case of  $\bar{z} < 1$ .<sup>2</sup> Panels 1A, 1B, and 1C specifically display the optimal capital income tax mix for a high profit income individual (with  $\gamma_i/y_i > 1$ ), the average profit income individual (with  $\gamma_i/y_i = 1$ ), and a low profit income individual (with  $\gamma_i/y_i < 1$ ), respectively. In all three panels, the optimal tax rates  $u$ ,  $v$ , and  $z$  are on the vertical axis, and the government revenue requirement,  $G$ , is on the horizontal axis.

In panel 1A, the value of  $\gamma_i/y_i < 1$  for the low profit income individual is chosen so that with  $G = 0$ , the individual prefers  $z = \bar{z}$  and  $v > 0$  and  $u < 0$  as in case [3] above.<sup>3</sup> As  $G$  is increased, both the saving tax,  $u$ , and the investment tax,  $v$ , are optimally increased for the low profit income individual, and eventually both taxes are positive. In panel 1B, the average profit income individual with  $\gamma_i/y_i = 1$  is assumed to prefer  $0 < z < \bar{z}$  and  $v = 0$  and  $u < 0$  if  $G = 0$  as in case [2] above.<sup>4</sup> As  $G$  is increased beyond zero, first only the profit tax,  $z$ , is increased to its maximum value,  $\bar{z}$ . At that point, the capital income tax mix switches to regime [3] above, and a further increase in  $G$  is met with increases in the tax rates  $u$  and  $v$ . Again, at very high values of  $G$ , the saving tax,  $u$ , and the investment tax,  $v$ , are both positive. Finally, panel 1C displays the optimal tax mix for a high profit income individual with  $\gamma_i/y_i > 1$ . Now with  $G = 0$ , we see that the high profit income individual prefers a tax regime characterized by  $z = 0$ ,  $v < 0$  and  $u > 0$  as in case [1] above. As  $G$  is increased beyond zero, first both  $u$  and  $v$  are increased until  $v = 0$ . At that point, the tax regime switches to case [2] above, and further increases in  $G$  are met only with increases in the profit tax rate  $z$  until  $z$  reaches its maximum  $\bar{z}$ . At even higher levels of  $G$ , the tax regime corresponds to case [3], and increases in  $G$  are met with increases in both  $u$  and  $v$ , while  $z$  remains at its maximum  $\bar{z}$ . In summary, we see that an agent's preferred tax regime can switch

from case [1] to case [2] or from case [2] to case [3] if the agent's relative profit income declines or if required government revenues,  $G$ , increase. As a special case, it is interesting to consider that taxation is only redistributive with  $G = 0$ . The left extremes of the three panels of Figure 1 then indicate the tax figurations chosen by the low profit income individual, the average profit income individual, and the high profit income individual.

#### 4. *Tax policy in a voting equilibrium*

Next, we consider tax policy as determined by majority voting. Voters specifically decide on combinations of the taxes  $u$ ,  $v$ , and  $z$  given a predetermined value of  $G$ . Generally, with multiple tax instruments convexity of preferences and of the feasible tax instrument set are insufficient to rule out cycling in pairwise votes on alternative instrument combinations. All the same, in the present model the median voter's optimal instrument combination,  $t^* = (u^*, v^*, z^*)$ , can be shown to be a Condorcet winner in the sense that it defeats any other feasible policy combination  $t = (u, v, z)$  in a pairwise vote where the median voter is the agent with median relative profit income  $\gamma_i/y_i$ . To see this, first note that the derivatives of the indirect utility,  $W(\gamma_i/y_i)$ , in (6) with respect to the three tax rates are linear in  $\gamma_i/y_i$  (for instance,  $W_z(\gamma_i/y_i) = -\phi(\gamma_i/y_i)(1 - \alpha)P/(1 + r - u)$ ). This means that condition (1) in Bucovetsky (1991, p.116) for the policy preferred by the median voter to be a Condorcet winner is satisfied.<sup>5</sup> To check this, let  $D(t, \gamma_i/y_i)$  be agent  $i$ 's utility with the policy combination  $t$ , minus this agent  $i$ 's utility with the policy combination  $t^*$  as preferred by the median voter. The utility difference,  $D(t, \gamma_i/y_i)$ , can be written as follows,

$$D(t, \frac{\gamma_i}{y_i}) = \int_0^1 \delta \nabla W(t + s\delta) ds \quad (14)$$

where  $\delta = t - t^*$  and  $\nabla W$  is the vector of utility derivatives  $W_u$ ,  $W_v$ , and  $W_z$ . As these utility derivatives are linear in  $\gamma_i/y_i$ , it follows that  $D(t, \gamma_i/y_i)$  in (14) is also linear in  $\gamma_i/y_i$ . Consequently, the median voter's preferred policy combination,  $t^*$ , indeed is a Condorcet winner. In other words, the capital income tax mix, as decided by majority voting, reflects the preferences of the agent with median relative profit income  $\gamma_i/y_i$ .

Any capital income tax mix displayed in the three panels of Figure 1 can in fact represent the capital income tax mix as preferred by the median voter. Correspondingly, we can summarize the capital income tax mixes that can materialize with voting as follows,

*Proposition 1.* The decisive, median voter generally may wish any profit tax rate,  $z$ , in the interval  $[0, \bar{z}]$  if  $G > 0$  and  $\bar{z} < 1$ . Different values of the profit tax rate,  $z$ , can be combined with different values of the saving tax,  $u$ , and the investment tax,  $v$ , as follows,

- (1) if  $z = 0$ , then  $v \leq 0, u > 0$ ,
- (2) if  $0 < z < \bar{z}$ , then  $u \leq 0, v = 0$ ,
- (3) if  $z = \bar{z}$ , then  $u \leq 0, v \geq 0$ .

The proposition clearly reflects that the investment tax,  $v$ , serves as a second-best tax on firm profits, as with an interior value of  $z$  (case [2]) we have  $v = 0$ . Only if the profit tax  $z$  is at its lower bound of 0 (case [1]) is the investment tax,  $v$ , possibly negative. With  $z = \bar{z}$ , the investment tax,  $v$ , is non-negative, while the saving tax,  $u$ , can be of either sign. Note that with  $\bar{z} = 1$  all policy combinations in the proposition other than  $z = \bar{z}$  and  $v > 0$  are possible voting outcomes.

It is interesting to compare the possible outcomes in Proposition 1 with those that may occur in a representative agent framework where all agents receive profit and endowment income in an equal ratio. In this instance, not all of the tax regimes represented in Proposition 1 can materialize. In fact, tax constellations as in case [1] of Proposition 1 with  $z = 0, v \leq 0$ , and  $u > 0$  are impossible outcomes for tax policy in a representative agent framework.

## 5. Tax policy and the degree of foreign ownership of firms

In this section, we consider how tax policy, as determined by majority voting, is affected by the degree of foreign ownership of domestic firms as indexed by the parameter  $\alpha$ . As a special case, the section considers that there is no foreign ownership at all, i.e.  $\alpha = 0$ . In examining how

tax policy depends on  $\alpha$ , we can distinguish a direct and an indirect effect of a change in  $\alpha$  on the three tax rates,  $u$ ,  $v$  and  $z$ . The direct effect concerns how the degree of foreign ownership affects tax policy for a given relative saving,  $s_i$ , of the decisive, median voter, and for given values of the saving semi-elasticity  $e_u$  and the consumption propensity  $p$ . The indirect effect takes into account any change in  $s_i$ ,  $e_u$  and  $p$ . The direct effect is relatively straightforward: a higher foreign ownership share for given values of  $\gamma_i$  reduces all agents' ownership of domestic firms and thus naturally affects the choice between investment and profit taxes, as borne by domestic and foreign firm owners, and saving taxes, as borne purely by domestic residents. The indirect effect, however, is less straightforward. A change in the foreign ownership parameter,  $\alpha$ , alters all agents' profit incomes relative to their endowment incomes. If agents start from unequal profit/endowment income ratios, then an agent  $i$ 's relative saving,  $s_i$ , can change as well. This change in itself affects the median voter's preference for saving taxes vs. profit and investment taxes. Moreover, given homothetic preferences on the part of individuals, at least one of the two variables  $e_u$  and  $p$  will necessarily change in response to an increase in the degree of foreign ownership of firms. If, say, the saving semi-elasticity,  $e_u$ , falls, this makes the saving tax more attractive, tending to alter the preferred tax mix.

First, we will focus on the direct effect of a change in  $\alpha$  on the tax mix starting with case [2] of Proposition 1 where  $0 < z < \bar{z}$ ,  $u < 0$ , and  $v = 0$ . In this instance,  $v$  remains at zero following a change in the foreign ownership share,  $\alpha$ . From (12), however, we see that the saving tax,  $u$ , changes directly as follows,

$$\frac{\partial u}{\partial \alpha} = -\frac{I}{(1-\alpha)^2 \hat{e}_i} < 0 \quad \text{for a given } s_i, e_u \text{ and } p \quad (15)$$

while, of course, the profit tax,  $z$ , has to increase to make up for the higher saving subsidy. As expected, a higher foreign ownership share thus leads to a higher rate of profit taxation, with the proceeds used to increase the saving subsidy.

Next, the profit tax rate is bounded at  $0$  and  $\bar{z}$  in cases [1] and [3] above, respectively. In either case, we can use (11) to see how a change in the foreign ownership share,  $\alpha$ , affects the investment tax,  $v$ , relative to the saving tax,  $u$ , in the voting equilibrium. To proceed, we see how in (11) the investment tax,  $v$ , changes with  $\alpha$ , while keeping the saving tax,  $u$ , and agent  $i$ 's relative saving,  $s_i$ , fixed. Clearly, if we find  $\delta v / \delta \alpha > 0$ , then a higher foreign ownership share,  $\alpha$ , leads to a larger investment tax,  $v$ , and a smaller saving tax,  $u$ , for a given (bounded) value of the profit tax,  $z$ , and a revenue requirement,  $G$ . From (11), we can derive the direct effect as,

$$\frac{\partial v}{\partial \alpha} = \frac{1-z}{e_v} \left[ \frac{\gamma_i}{s_i} (1 - e_u u) - p u \right] > 0 \quad \text{for a given } s_i, e_u \text{ and } p \quad (16)$$

where  $1 - e_u u > 0$ . All the same, the derivative  $\delta v / \delta \alpha$  can be of either sign. We will consider two examples.

First, let us take the representative agent case, with  $\gamma_i / s_i = 1$ , and let us assume that income effects are arbitrarily small, with  $p$  approaching  $0$ . Now we have  $\delta v / \delta \alpha > 0$  in (15). In this instance, a higher foreign ownership share,  $\alpha$ , thus leads to a higher investment tax,  $v$ , and a lower saving tax,  $u$ . A higher foreign ownership share,  $\alpha$ , naturally causes a larger desired investment tax,  $v$ , on partly foreign-owned firms. With  $p$  approaching  $0$ , the higher second-period investment tax has no influence on first period saving or consumption. In this instance, a decrease in the saving tax,  $u$ , is the preferred second-best manner to transfer resources, raised by a higher investment tax, to domestic citizens including the decisive, median voter.

As a second example, consider the case where the decisive voter receives no profit income at all, i.e.  $\gamma_i = 0$ , while there are second period income effects on first period saving, i.e.  $p > 0$ . Furthermore, assume that the saving tax rate  $u$  is positive at the outset. Now  $\delta v / \delta \alpha < 0$  in (16), and thus that a higher foreign ownership share,  $\alpha$ , leads to a larger emphasis on the saving tax,  $u$ , and a smaller emphasis on the investment tax,  $v$ . To see why, note that a higher foreign ownership share,  $\alpha$ , does not affect the decisive agent's second period profit income which is assumed to be

zero. The foreign ownership share, therefore, does not affect this agent's first period saving. A higher foreign ownership share, however, does raise the first period saving of other agents for whom  $\gamma_i > 0$ . As a result, the saving tax base is broadened and the saving tax is more attractive than before. These two examples show that a higher foreign ownership share,  $\alpha$ , can change the taxes  $u$  and  $v$  in either direction on account of the direct effect if the profit tax rate,  $z$ , is bounded at its minimum or its maximum value.

Next, we take into account that generally  $s_i$ ,  $e_u$  and  $p$  change on account of the foreign ownership share,  $\alpha$ . To start, note that agent  $i$ 's saving,  $S_i$ , is changed on account of a change in the foreign ownership share,  $\alpha$ , as follows,

$$\frac{\partial S_i}{\partial \alpha} = p(1-z)\gamma_i P \geq 0 \quad (17)$$

As expected, agent  $i$ 's absolute saving,  $S_i$ , generally increases with  $\alpha$ . Next, agent  $i$ 's relative saving,  $s_i$ , changes with  $\alpha$  as follows,

$$\frac{\partial s_i}{\partial \alpha} = p(1-z) \frac{P}{S} (\gamma_i - s_i) \quad (18)$$

$$\frac{\partial (\gamma_i/s_i)}{\partial \alpha} = -\frac{\gamma_i}{s_i} p(1-z) \frac{P}{S} \left( \frac{\gamma_i}{s_i} - 1 \right) > 0 \quad \text{as} \quad \frac{\gamma_i}{s_i} < 1 \quad (19)$$

In (18), we see that  $\delta s_i / d\alpha > 0$ , as  $\gamma_i/s_i > 1$ , and vice versa. In words, the relative saving of agents with a relatively large profit income rises with the foreign ownership share,  $\alpha$ , and vice versa.

Next, we have to consider what may happen to the semi-elasticity of saving,  $e_u$ , and the propensity to consume in the first period out of second period income,  $p$ , following an increase in the foreign ownership share,  $\alpha$ . Aggregate saving can be written as  $S = Y[1 - (1+r-u)p] - p(1-z)(1-\alpha)P$  (cfr. (3)), which after differentiation yields the following expression for the saving semi-

elasticity,

$$e_u = \frac{(1+r-u)Y + (1-z)(1-\alpha)P}{S} \frac{\delta p}{\delta u} - \frac{pY}{S}$$

From this expression, we can see that in general  $e_u$  and/or  $p$  will vary with the degree of foreign ownership  $\alpha$  varies.<sup>6</sup> To limit complexity, we assume in the following that the propensity to consume in the first period out of first period income, i.e.  $p(1+r-u)$ , is constant. From this, we see that  $\delta p/\delta u = p/(1+r-u)$  so that the semi-elasticity,  $e_u$ , is given by,

$$e_u = p \frac{(1-z)(1-\alpha)P}{S(1+r-u)} > 0 \quad (20)$$

With  $p(1+r-u)$  constant, we have  $dp/d\alpha = 0$  and,

$$\frac{\delta e_u}{\delta \alpha} = -\frac{e_u}{1-\alpha} [1 + e_u(1+r-u)] \quad (21)$$

In words, the propensity to consume in the first period out of second period income is unaffected by the change in  $\alpha$ , while the saving semi-elasticity declines as a result. Combining the above expression with the definition of  $\hat{e}_i$ , we find that  $\hat{e}_i$  changes with  $\alpha$  as follows,

$$\frac{\delta \hat{e}_i}{\delta \alpha} = -\frac{(\gamma_i/s_i) e_u}{1-\alpha} [1 + (\gamma_i/s_i) e_u(1+r-u)]$$

This expression is likewise negative, if we assume that agent  $i$  has positive savings and positive profit income in the second period so that  $\gamma_i/s_i > 0$ .

Returning to case [2] with  $0 < z < \bar{z}$ ,  $u < 0$ , and  $v = 0$ , we see that the combined direct and indirect effect on the saving tax,  $u$ , of a change in the foreign ownership share,  $\alpha$ , is as follows,



$$\begin{aligned} \frac{\delta u}{\delta \alpha} = & -\frac{1}{\hat{e}_i (1 - \alpha)^2} \\ & + \frac{1}{\hat{e}_i^2} \frac{(\gamma_i/s_i) e_u}{1 - \alpha} [((\gamma_i/s_i) - 1)(1 - (1 + r - u)p) - \frac{\alpha}{1 - \alpha} (1 + (\gamma_i/s_i) e_u (1 + r - u))] \end{aligned} \quad (22)$$

In (22), the first term on the right hand side is the direct effect as before, while the second term represents the indirect effect via changes in  $s_i$  and  $e_u$ . We see that  $\delta u/\delta \alpha < 0$ , if  $\gamma_i/s_i < 1$ . The equilibrium saving tax rate,  $u$ , thus declines following an increase in foreign ownership, if the decisive voter receives relatively little profit income. Generally, however, the sign of  $\delta u/\delta \alpha$  in (22) is ambiguous. For instance, a constellation of  $(\gamma_i/s_i)$  well in excess of two, positive  $\gamma_i$  and  $s_i$ , and sensible values of  $u$ ,  $p$  and  $e_u$  will in fact yield  $\delta u/\delta \alpha > 0$ . Hence, a median voter, heavily reliant on profit income and saving only little, will in fact prefer a higher saving tax rate following a larger foreign ownership share.

Returning to cases [1] and [3] with a value of  $z$  at one of its bounds, we see that the combined direct and indirect effect on  $v$  of a change in  $\alpha$  (for a given value of  $u$ ) is as follows,

$$\begin{aligned} \frac{\delta v}{\delta \alpha} = & \frac{1 - z}{e_v} ((\gamma_i/s_i) (1 - e_u u) - p u + \\ & e_u (\gamma_i/s_i) [((\gamma_i/s_i) - 1)(1 + r - u)(1 - e_u u) - u(1 + (1 + r - u) e_u)]) \end{aligned} \quad (23)$$

The indirect effect of  $\alpha$  on  $v$  via changes in  $s_i$  and  $e_u$  is represented by the term in the square brackets in (23). We see that the indirect effect strengthens the case for a positive relationship between  $v$  and  $\alpha$ , if in fact  $\gamma_i/s_i > 1$  and  $u < 0$ , and vice versa. After taking into account both direct and indirect effects, we conclude that generally it is unclear how a higher foreign ownership affects the capital income tax mix, as determined by the median voter. Intuitively, one expects that a higher foreign ownership share leads to a larger emphasis on source-level company taxation (i.e. on investment and profit taxation) and a smaller emphasis on resident taxation (i.e. saving

taxation). While in all cases considered this outcome is possible, the opposite can also occur in some instances.

For comparison, it is now interesting to see how a larger foreign ownership share,  $\alpha$ , affects tax policy in the representative agent case. Setting  $\gamma_i/s_i = 1$  in (22) and (23) immediately yields the following simpler expressions,

$$\frac{\delta u}{\delta \alpha} = -\frac{1}{(1-\alpha)^2 e_u^c} \left[ 1 + \frac{\alpha e_u}{e_u^c} (1 + (1+r-u)e_u) \right] \quad (24)$$

and

$$\frac{\delta v}{\delta \alpha} = \frac{1-z}{e_v} \left[ 1 - e_u^c u - e_u u (1 + (1+r-u)e_u) \right] \quad (25)$$

The negative sign of (24) corresponds to the intuition that a higher foreign ownership share leads to a higher company taxation in the form of a higher profit tax or a higher investment tax. The same inference is drawn from (25), if the saving tax rate is either negative or only moderately positive. For very high values of  $u$ , however, it is possible that  $u[e_u^c + e_u(1 + (1+r-u)e_u)] > 1$  so that a higher foreign ownership share of firms leads to a lower taxation of investment. As saving becomes less responsive to taxation, it then is attractive to put more weight on the already high saving tax in comparison to the investment tax.

These results are summarized as follows,

*Proposition 3.* Unless the saving tax rate is very large (so that  $u > 1/[e_u^c + e_u(1 + (1+r-u)e_u)]$ ), for a representative agent, unambiguously  $\delta u/\delta \alpha < 0$ . This is accompanied by  $\delta z/\delta \alpha > 0$  if  $z < \bar{z}$  and  $v = 0$ , and by  $\delta v/\delta \alpha > 0$  if  $z = \bar{z}$  and  $v \geq 0$ . With voting, the opposite response is also possible, i.e.  $\delta u/\delta \alpha > 0$  and  $\delta z/\delta \alpha < 0$  if  $z \leq \bar{z}$  and  $v = 0$ , and  $\delta v/\delta \alpha < 0$  if  $z = \bar{z}$  and  $v > 0$ .

Note that an increase in the foreign ownership share,  $\alpha$ , necessarily reduces the welfare of the median voter. The change in  $\alpha$  and the induced tax policy changes may on net, however, increase other agents' welfare. For instance, consider the example where an increase in  $\alpha$  leads to a shift from saving taxation to profit or investment taxation. This change necessarily increases the welfare of agents, if any, that receive only first period endowment income, i.e. for whom  $\gamma_i = 0$  and  $y_i > 0$ .

To conclude this section, it is interesting to consider the special case of no foreign ownership of domestic firms, i.e.  $\alpha = 0$ . First, let us examine what capital income tax policy regimes are possible in this instance, if tax policy is determined by voting. As it turns out, all tax regimes spelled out in Proposition 1 remain possible voting outcomes. The reason is that the median voter, in deciding on tax policy, only cares about his profit income relative to others, regardless of whether these others are domestic or foreign residents. Second, the tax regimes that are possible in the representative agent framework are more restricted in the absence of any foreign ownership of domestic firms. To be precise, without any foreign ownership the role of the saving tax as a second-best transfer from foreign residents to domestic residents disappears. Thus a negative saving tax,  $u$ , can no longer be part of the optimal tax mix chosen by the representative agent in the absence of any foreign ownership. In fact, optimal tax policy in this instance can take one of two forms. First, there can be positive profit taxation at a rate less than the maximum rate  $\bar{z}$ , while both the distorting saving tax,  $u$ , and the distorting investment tax,  $v$ , are equal to zero. This outcome arises at relatively low government revenue requirements. Second, the profit tax rate can be at its maximum, while any additional tax revenues are raised by positive taxes on both saving and investment (provided the maximum profit tax rate is below unity), i.e. we have  $z = \bar{z}$  with  $u \geq 0$  and  $v \geq 0$ . Without foreign ownership, the representative agent thus always favors a positive profit tax if  $G > 0$ , while the saving and investment taxes are both non-negative.

## 6. *Concluding remarks*

This paper has examined the political economy of capital income taxation in a small open economy. Capital income taxation in principle can consist of profit, investment and saving taxation. The paper finds that the profit tax may not be used at all or only to a small extent if the decisive, median voter receives profit income relatively abundantly. A negative saving tax or a negative investment tax generally are part of the tax mix in a voting equilibrium, if domestic residents differ in their profit income relative to their earlier endowment income. A median voter generally is interested in redistributing income towards himself regardless of whether other individuals subject to domestic taxation are domestic or foreign residents. With majority voting, a higher foreign ownership may induce a shift towards higher profit or investment taxes and lower saving taxes as well as the opposite.

In a political equilibrium, limited profit taxation and negative saving or investment taxation thus can occur regardless of whether domestic firms are partly foreign-owned. In a representative agent framework, however, the representative agent can only redistribute resources from foreign owners of domestic firms towards himself. In this situation, therefore, a positive foreign ownership of domestic firms is necessary to explain a negative saving tax. Foreign ownership in an environment of international firm mobility may also be a reason why profits cannot be fully taxed. In practice, many countries indeed seem to tax pure profits only to a limited extent. Also, some countries appear to provide tax incentives to domestic savers to such an extent that saving is effectively subsidized. Political economy considerations, as considered in this paper, can contribute to explaining these features of actual tax systems. Finally, the model can be reinterpreted and extended if profit income is recast as labor income. If then labor supply is made endogenous and there are constant returns to scale, the model closely corresponds to Bucovetsky and Wilson (1991) save for the foreign ownership of firms. The introduction of political economy may equally provide interesting insights into the taxation of labor, saving and investment in open economies.

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### Endnotes

1. We assume that a negative profit tax is not possible. This explains why in the later analysis a median voter may favor a negative investment tax as a second-best negative profit tax.
2. To obtain figures correponsing to the case of  $\bar{z} = I$ , any positive value of the investment tax,  $v$ , in Figures 1A-1C should be reduced to zero.
3. Alternatively, the low profit individual may prefer  $z < \bar{z}$ ,  $v = 0$ ,  $u < 0$  with  $G = 0$ . Figures 2A, 3 and 4 then change accordingly.
4. This is tantamount to assuming that  $\bar{z} \geq \alpha S / (e_u^c (I - \alpha) P)$ , i.e. that the maximum profit tax rate and the saving elasticity are high, or that the foreign ownership share is low. Alternatively, the invididual with  $\gamma_i/s_i = I$  wishes  $z = \bar{z}$ ,  $v > 0$ ,  $u < 0$  with  $G = 0$ . Figures 2B, 3 and 4 then change accordingly.
5. See Bucovetsky (1991, section 3) for a condition on the underlying preferences that follows from the sufficiency condition (1) for the median voter's preferred policy to be a Condorcet winner.
6. To see this, we can take  $p$  to be constant, and thus  $\delta p / \delta u$  to be zero. A change in  $\alpha$  then increases aggregate saving,  $S$ , and also the semi-elasticity,  $e_u$ .